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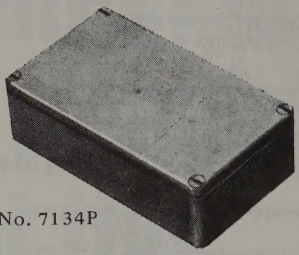

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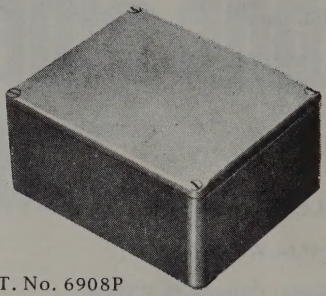

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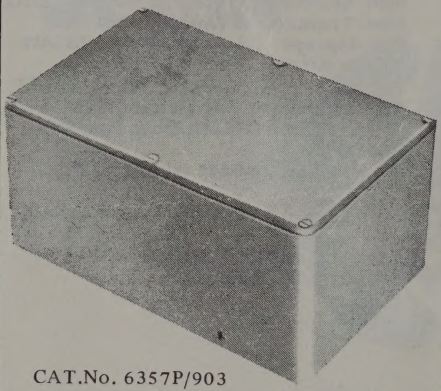

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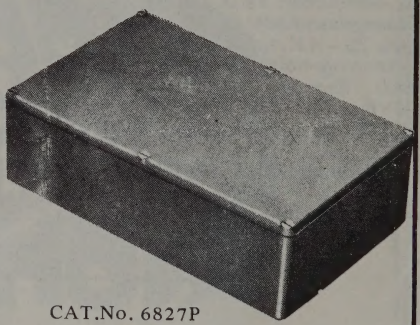

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CONTENTS – INHOUD

General/Algemeen:

An Avenue of Friendship – by Diana Green ZS6GH	7
Silent Key	8
Branch News	26
Book Review – by Colin Duff ZS1CA	28
H.Q. Notes/H.K. Notas	31
Letters to the Editor	35
Hamads	36

Technical/Tegnies:

A High Performance Converter for 40 metres – by Tom Harvey ZS6AUN	5
A sideband Package – by E. P. Rosewarne ZS6WI	13

Operating/Bediening:

Amendments to Callbook	10
San Diago awards	12
Frequency Prediction Charts	23
Six Metres – A most interesting Band - By D. L. Crawcour ZS6ADZ	24
Jubilee International LZ DX Contest	28
Pacifica Award	35

Cover/Voorblad:
Reg Green ZS6J, who with his XYL Diana ZS6GH (see page 7), certainly proves that hamradio maketh a happy home.

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A HIGH PERFORMANCE CONVERTOR FOR 40 METRES

by Tom Harvey ZS6 AUN

It is becoming increasingly difficult for the inpecunious ham to get on the air without incurring heavy expenses in the way of new equipment. Most hams in such circumstances are prepared to construct their own transmitters, but receivers are tricky things and very few hams like to tackle such a project. Generally they settle for an existing receiver in the home QTH and find that there are problems about receiving CW or SSB, tuning is critical without bandspreading and muting can also be a difficulty. Often the sensitivity of such a receiver also leaves much to be desired.

The solution to these problems is a convertor and Figure 1 shows the circuit of a 40 metre convertor which has given a great deal of satisfaction both in the home QTH and for mobile work. It uses field effect transistors in the R.F. and mixer stages and provides for an output into any receiver covering the lower end of the broadcast band. Even with transistor portable receivers good performance is possible provided the stations being received fall in between the commercial stations which will still be picked up on the broadcast band through the receiver's built-in antenna system. Even in this case, however, the broadcast station can usually be phased out by turning the receiver until the signal strength of the broadcast station is reduced to a minimum. With car receivers this problem does not exist.

The convertor can be left in circuit and with switch S1 in the number one position the convertor is by-passed and power to it is switched off. Position 2 brings the convertor into action. Position 3 brings in the 2N706 stage which is a 455KC/S B.F.O. and this provides for C.W. and S.S.B. reception. If the station being received is very strong, S1 can be moved to position 4 and this will bring in an attenuator.

Socket J3 is a miniature Japanese type of jack socket. Without the jackplug inserted the convertor will operate but cannot be muted. By inserting the jackplug and connecting a pair of leads to auxilliary contacts on the transmitter send/receive switch or on the antenna change-over relay, automatic receiver muting will be obtained when transmitting. (The receiver is in fact left running but the convertor will mute.)

Coils L1, L4, L5 and L8 are each made from 36 turns of 30 gauge wire close wound on 9/32" slug tuned formers. L2 and L3 are each 5 turns of thin hook-up wire wound over the earthing end of L1.

Coil L1 should be shielded from the other coils by a shield as shown. Coils L4 and L5 should be spaced about $1\frac{1}{2}$" apart and need not be shielded from each other.

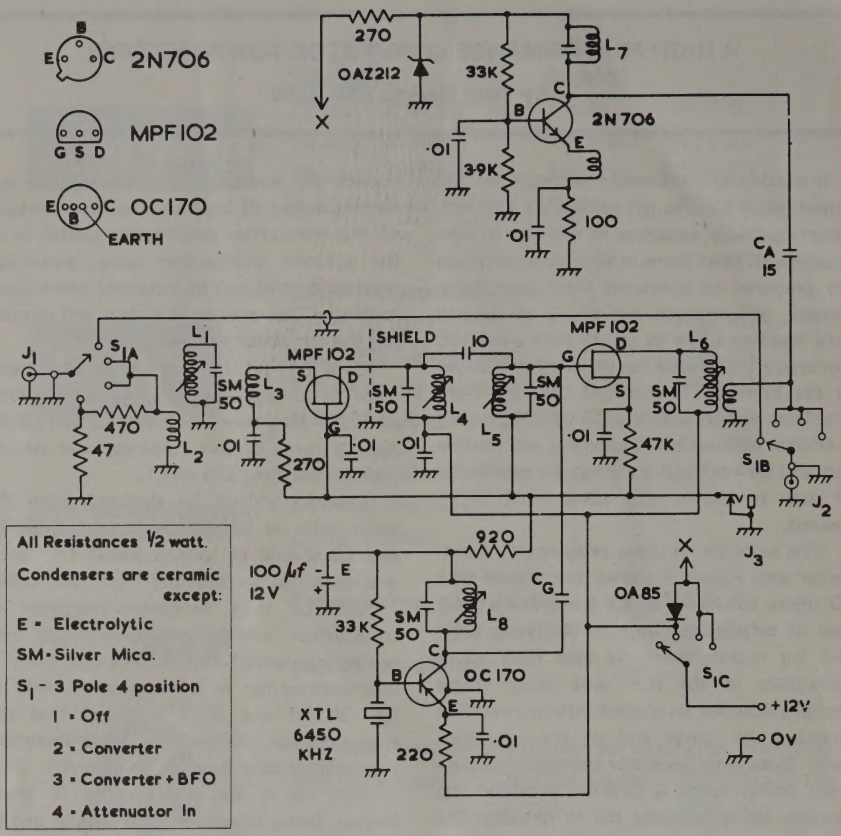
Coil L7 is a miniature transistor IF transformer which comes with its own tuning condenser built in. The secondary of this transformer is in the emitter lead of the 2N706 and if it is found that this stage does not oscillate then these secondary connections may have to be reversed.

Coil L6 is also a transistor IF transformer, but a miniature type should not be used here as it has to be modified by unsoldering the built-in condenser across the primary and substituting a smaller valued one. This proved to be the trickiest part of the whole construction and the problem was solved by soldering in a 365 p.f. variable condenser at first, tuning this for peak signal strength and then measuring the setting. This turned out to be 50 p.f., but may not necessarily be the same for all transformers.

Condenser CA is shown as 15 p.f. but may have to be adjusted if BFO strength is too high or too low for the set you are using.

Condenser CG is a "Gimmick" made by twisting a pair of $2\frac{1}{2}$ " long pieces of thin hook-up wire together.

Construction of the converter can be done on a perforated phenolic board 5 " x $3\frac{3}{4}$ " in size with shields made from thin flashing copper. The whole unit can be mounted in a box made from aluminium 20 gauge sheet with overall dimensions of $5\frac{1}{4}$ " x 4 " x 1 ".



40 METRE CONVERTER AND BFO.

Fig 1.

After constructing the unit, connect a battery of 12 volts as shown (observe polarity!) and then adjust the slug of L8 until the OC170 transistor starts oscillating. This can be checked by picking up the signal on the short wave band of a receiver the 41 and 49 metre bands.

Connect an antenna to J1 and the broadcast receiver antenna to J2. Strong signals should then be picked up by tuning the receiver. Peak coils L1, L4, L5 and L6 to give maximum signal strength when tuned to weak ham stations.

With switch S1 in position 2, tune in a station, then switch S1 to position 3. Tune the condenser, switch the IF transformer L7 until the BFO is zero beat with the station. With this setting left unchanged it will then be possible to tune in CW and SSB stations on the broadcast receiver. If SSB stations are very strong, switching to position 4 will help to resolve them.

When working mobile the convertor can be operated from the car battery if AM stations are being received. For SSB, however, variations of battery voltage will cause small changes in pitch in spite of the presence of the Zener diode OAZ212. In this case it would be desirable to supply the convertor from a separate battery. As the drain is only 12 milli-amps, battery life will be good.

AN AVENUE OF FRIENDSHIP

by Diana Green, ZS6GH

At some time or another, we have all no doubt come across people who tell us that they find it difficult to make friends, and they feel inadequate because they have no hobbies. Usually, it is the lack of hobbies which make people feel lonely, and they have no avenues to make or expand friendships. This situation often arises when children are brought up in a home where the parents have no hobbies or interests.

Amateur Radio in any home lends an atmosphere of warmth and friendship. Hams are of the opinion that their hobby is the greatest of them all, and there is ample reason for them to say so. What other hobby opens up friendship between all the peoples of the world?

If you have a Transmitter, Receiver and Antenna, within minutes you can stretch out a hand of friendship right across the globe. What other hobby will make people call each other by their first name in minutes? Cheerful voices float through the air waves from one home to another. In an hour, a ham can speak to 10 or more people, or less if he or she wishes. You can travel from Hong Kong to Malaya, Australia, Guam, Taiwan, Korea, Burma, Thailand, Seychelles, or to Marion Island in an hour. Some hams are going to bed, others preparing for dinner, many burning midnight oil, and if you speak to the U.S.A., then a hearty "Good Morning" is extended, if it is afternoon in South Africa.

If hams travel around the country in the course of their daily routine, or go anywhere on pleasure, they can take their hobby with them. A Mobile Rig can be put into a car, and a station operated while driving. Hams at sea take their equipment across the ocean waves, most of them working on cargo boats. Many hams have worked Aeronautical Mobile, so today, rigs are being operated in the sky. These radio operators who have Mobile Rigs can make friends in any town they visit, and Maritime

Mobile fans find friends who are hams, in many parts.

If hams prefer to operate a Morse Key, then the fingers do all the work. It takes longer perhaps, to say something, but a keen sense of perception is developed. The ear becomes attuned, and during times when conditions are poor, radio telegraphy will succeed where the microphone will fail. Some hams have never owned a microphone.

Romance has resulted from friendships made over the air. One LYL and an OM (It could mean young or old man) used to talk frequently in the U.S.A. They were at least 3,000 miles apart, and the weekly talks led to daily chats. Eventually they decided to meet at a point half-way across their country, so each one travelled 1,500 miles. Marriage resulted, and the pair settled down happily to a life of "dit-dah". In due course, little Harmonics arrived, who, no doubt, will become hams in time to come.

This hobby is a boon to people who are confined to bed or a wheelchair. Even blind people weave their lives around Amateur Radio. At any time of the day, someone is waiting to share some minutes or hours with another human being. Life assumes a more rosy hue, because of this hobby which opens so many doors.

Lasting friendships have been made over the air — sometimes, one does not necessarily meet the ham on the other side of the globe, but a daily talk is part of the routine. Some people have made more than 1,000 contacts with the same person, and enjoyed every moment of each chat. On occasion, when a contact is made, a ham has been known to say "I last spoke to you 15 or 20 years ago". It is not a case of a good memory, but because many hams keep an up-to-date Index Card system. It certainly would add an aura of warmth to a chat after such a long time.

Every day, somewhere in the globe, ham meets ham, and in this instance, the meeting is between people of two different countries. Some one knocks on a door in Los Angeles, California, U.S.A. and when it is opened, says "I'm Mr. XYZ from South Africa, ZS1000". Even before the salutations are completed, the visitor is ushered into the house, and treated like a V.I.P. This is referred to as an "eyeball QSO". Such friendships lead to close kinship, and often the visitor is taken all over the particular State or Country, feted at a Hamfast, etc. before he leaves. As one door closes, so another opens.

Those who are attracted to the hobby of Amateur Radio are indeed fortunate. They say "one man's meat, is another man's poison", and there are many people who shake their heads and say that they would find all that talking would give them a headache, in addition to coping with QRM, QRN, QSB, etc. Probably Bird Watching would appeal to them more, or even fishing. That maybe self-satisfying in a way, but you can't make so many friends through these hobbies. Admittedly, groups may indulge in these outdoor pursuits, but what do you do when it rains? Many hobbies do not lead avenues of friendship with people all over the world.

In many countries, radio hams can help authorities during emergencies. When communications are destroyed through water, fire or earthquake, the path to speech is always open. The air waves are waiting for the voices to send distress calls, to bring helpers to the scene, food or medicines, etc. No other hobby can do so much for mankind in such a short space of time.

Silent Key

We regret to announce that we have been advised by the I.A.R.U. that Herbert Hoover, Jnr., W6ZH/K6KH, former President of I.A.R.U. and A.R.R.L. passed away early this month. W6ZH was an energetic worker in the cause of amateur radio and was probably as much responsible as any other individual for the high status of amateur radio both in the U.S.A. and in the international sphere.

(Right) RSA leaving Cape Town 19th July, 69 with Martin du Preez ZS6XY, en route for Gough Island

Photos: H. M. Wilson ZS1BF

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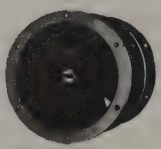

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AMENDMENTS TO CALLBOOK No. 22

NOTE BY CALLBOOK EDITOR

It would seem from the P.M.G.'s list of amendments that a number of members and non-members have failed to advise Headquarters of their change of address.

Amendments to Division 5 and 6 will follow in the next issue of Radio ZS.

ZS1AM	Tom J. Williams, 15, Wessels Road, Green Point, C.P.
ZS1AS	W. P. Schonken — delete — see ZS4EQ.
*ZS1AV	A. C. M. van der Wel, 42, Heide Street, Bloemhof Estate, Bellville, C.P.
*ZS1CH	Dr. S. H. Walters, 29, Magnolia, Bellville, C.P.
ZS1DY	J. P. De Smidt, "Luala", 5 The Grange, Camps Bay. (P.O. Box 863, Cape Town.)
*ZS1EV	Chris Latsky, 169 Kommetjie Road, Fish Hoek. C.P. (P.O. Box 652, Cape Town.)
*ZS1FZ	F. Ziss, 34, Woodside Drive, Pinelands, C.P.
ZS1GM	J. L. Glen, 3 Airlie Road, Bergvliet. C.P.
ZS1GT	B. S. Janeke, 75 Knysna Avenue, George, C.P.
*ZS1HF	H. F. Randall — delete — see ZS5HF
ZS1JO	J. O. O'Connell — delete) see ZS6NE.
ZS1JR	J. Halgreen, 32 Cypress Way, Briza Estate, Somerset West, C.P.
ZS1JT	Ed Fouche, Sanfordstraat 56, Bellville.
ZS1JZ	C. V. C. Armstrong, 44 Borcherd Street, (P.O. Box 283) Upington.
*ZS1KB	L. J. R. Kritzinger, Hoërskool Sentraal, Beaufort-Wes. K.P.
ZS1KF	E. S. Teichert, Lot 11, Alphonse Way, Annaty Bank, Tokai, C.P.
ZS1KK	W. J. C. Vermeulen — delete — see ZS2KK.
*ZS1LK	M. J. MacGregor, 5 Cloetenberg Road, Somerset West, C.P.
ZS1LU	H. G. Manchip, "Moon Cat", (P.O. Box 359), Knysna, C.P.
ZS1MA	M. A. Nortje, 6 Hellenic Court, Main Road, Plumstead, C.P.
ZS1ME	C. E. J. Kinnear — delete — see ZS5MF.
*ZS1MH	J. W. Von Mollendorff, Radio Stasie, Klipheuwel. K.P.
ZS1MW	V. K. Short, 6 Louw Street, Welgemoed, Bellville. C.P.
*ZS1PO	A. H. Heunis, Thierrystraat 6, Stellenbosch.
ZS1Q	P. A. Rossouw, deleted by P.M.G.
*ZS1QM	Barry Brokensha, 70, Meath Street, Oakdale, Bellville. C.P.
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*ZS1VL	V. L. J. Meager — delete — see ZS5VM.
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ZS2CJ	C. A. J. Els, 42, Readheath, Algoa Park, Port Elizabeth. C.P.
ZS2CM	C. W. Page, 2 Briar Lane, Bonza Bay, Port Elizabeth, C.P.
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*ZS2FN	I. Norval, 13 Noord Road, De Aar.
ZS2FR	L. F. Van Heerden, 27 Braemer Road, Beacon Bay, East London.
ZS2FZ	P. J. Bain — delete — see ZS6FZ.
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ZS2HE	F. C. Roberts, 4 Fernlea, Cor. Havelock and Rose Streets, Port Elizabeth.
ZS2HN	V. C. Armstrong — delete — see ZS1JS.

ZS2HS	H. Strydom, Boabab Street, Ovistonnel, Venterstad.
ZS2HU	J. B. van Vuuren, 5 Clare Gardenia Street, Linton Grange, Port Elizabeth.
ZS2JR	L. J. R. Kritzinger, — delete — see ZS1KB.
ZS2KK	W. J. C. Vermeulen, 34, Oxford Street, De Aar.
ZS2L	R. F. Perkin, 5 Court Receife, Marine Drive, Summerstrand, Port Elizabeth.
ZS2LF	P. B. M. Marais, 39, Jacaranda Street, Cradock.
ZS2LW	A. A. J. Brits — delete — see ZS6AAB.
ZS2ML	B. T. Haarhof, 30 Fifth Avenue, Walmer, Port Elizabeth.
ZS2MP	W. J. A. Allen — deleted by P.M.G.
ZS2MW	W. J. Murison — delete — see ZS5MN.
ZS2NW	Mrs. Estelle H. Murison, delete — see ZS5ML.
ZS2PM	A. H. Heunis — delete — see ZS1PO (amendment in July ZS)
ZS2PO	M. H. G. Saayman, P.O. Box 1115, Port Elizabeth. C.P.
ZS2SS	B. Connolly — delete — see ZS1ST.
ZS2WR	A. J. Steenkamp, c/o Cement Works, P.O. Loerie.
*ZS3I	A. T. Bailie — delete — see ZS4AB
*ZS4AB	A. T. Bailie, Thabanchu.
ZS4AS	J. S. Delport, 8 White Street, Bloemfontein.
ZS4BH	E. Schulze, 21, Ruhr Street, Sasolburg. O.F.S.
ZS4BK	E. I. Langley, 134, Waverley Street, Bloemfontein. O.F.S.
ZS4CH	R. T. Senior, 81, Hercules Street, Beaconsfield, Kimberley.
ZS4DT	D. S. Oliver, Hookaai Buildings, 69, Dolf Street, Parys. O.F.S.
ZS4EJ	E. J. Venter — delete — see ZS6BBR.
ZS4EQ	W. P. Schonken, 1 Steyn Street, Hope Town.
ZS4ER	T. W. Gunter, 15 Heuwelsig, 45, Barnes Street, Bloemfontein.
ZS4FM	I. Norval — delete — see ZS2FN.
ZS4FW	L. R. Godden, 12 Cypress Crescent, Jim Fouche Park, Welkom.
ZS4GB	J. H. Joubert, P.O. Box 1153, Bloemfontein.
ZS4GM	J. J. Swart — deleted by P.M.G.
ZS4KU	Mrs. J. J. E. Jacobs, Goedehoop, Edenburg. P.F.S.
ZS4LH	Dr. J. D. Jordaan — delete — see ZS6GY.
*ZS4MZ	E. B. Cohen, 12, Victoria Street, Harrismith.
ZS4NS	F. G. Wolmarans — deleted by P.M.G.
ZS4NZ	Mrs. A. C. E. Jordaan — delete — see ZS6GZ.
ZS4PX	D. J. Schutte, 9th Avenue, Sishen.
ZS4PZ	C. T. A. Bendeman, 14 Grobler Street, Brandwag, Bloemfontein.
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ZS4SH	P. B. H. Jansen van Resnburg, 7 Vels Street, Sasolburg. O.F.S.
ZS4SRK	Sasolburg Radio Club, P.O. Box 108, Sasolburg. O.F.S.
ZS4SW	S. J. Van Wyk — delete — see ZS5HT.
ZS4TI	C. J. de Bruyn, Roodekop, P.O. Box 14, Glen.
ZS4TJ	Mrs. G. W. De Bruyn, Roodekop, P.O. Box 14, Glen.
*ZS4VC	V. C. Barnes — delete — see ZS6CV.
*ZS4VD	Mrs. P. A. Barnes — delete — see ZS6VD.
ZS4VR	N. J. van Rensburg, deleted by P.M.G.
ZS4WJ	W. J. Pansegrouw — deleted — see ZS6RD.
ZS4XT	Steve J. Bosman — delete — see ZS1XT
*ZS5AP	Ivor H. Davis, P.O. Box 140, Scottburgh. Natal.
*ZS5AX	should read Rev. Arthur Burney Trewin.
*ZS58	Maurice R. Timm, P.O. Box 31, Umkomaas. Natal.
*ZS5DS	Walter S. Reid, P.O. Box 907, Pietermaritzburg. Natal.
*ZS5DZ	Mrs. E. (Bee) Jordan, Teachers Training College, Church Street, Pietermaritzburg.

*ZS5EL	E. N. Lamberg, Private Bag 4004, Durban.
*ZS5EZ	Amend to H. J. Thomson, 134, Gale Street, Durban.
*ZS5HF	H. F. Randall, c/o P.O. Box 2460, Durban.
*ZS5HR	F. Ash, 6, Vausedale Crescent, Escombe, Natal.
*ZS5ID	Maurice R. Timm, P.O. Box 31, Umkomaas, Natal.
*ZS5MH	P. Kelly, "Kelly's Home", Shelly Beach, South Coast, Natal.
*ZS5MM	J. Smithies, — silent key — deceased (not ZS5NN vide Radio ZS July).
*ZS5RS	J. A. Kohler, 14, Valley Road, Belvedere, Hillcrest, Natal.
*ZS5SF	Ronnie Beare, Ronbea Furnishers, 553, West Street, Durban.
*ZS5UZ	J. B. Powell, 65, Winston Road, Pietermaritzburg.
*ZS5VF	C. G. Baillie-Searle, (address as per Callbook).
*ZS5VM	V. L. J. Meager, P.O. Box 275, Dalbridge, Natal.
ZS5WN	H. C. Graham — delete.
*ZS5WN	C. D. Williams, 6 Taylor Road, Scottsville, Pietermaritzburg. Natal.
*ZS6AAI	R. C. (Dick) Hardy, c/o Reid Bros S.A. Ltd., P.O. Box 236, Paarden Eiland.
*ZS6AJY	B. E. Brokensha — delete — see — ZS1QM.
*ZS6AL	Vidi La Grange, Dawnweg 501, Lynnwood, Pretoria.
*ZS6AR	Roy O Ehman, 7, Johann Rissik Drive, Waterkloof Ridge, Pretoria.
*ZS6ASA	N. M. Shoebotham, 16 Tielman Roos Avenue, Florida Park, Florida Tvl.
*ZS6AWP	Sarel J. van der Walt, Tobanistraat 26, Vanderbijlpark. SW5.
*ZS6BBR	E. J. (Tiny) Venter, 110 Lena Street, Linmeyer, Johannesburg.
*ZS6BJ	L. W. Ensor, 38 Crossways, Gidea Park, Romford, RM2 6AL, Essex, England.
*ZS6BLF	N. D. Mac Donald, 125, Partridge Avenue, Allen Grove, Kempton Park, Tvl.
*ZS6BLS	J. A. van Zyl, Van Lillstraat 52, Witpoortjie, Tvl.
*ZS6EV	Chris Latsky — delete — see ZS1EV
ZSFC	should read ZS6FC.
*ZS6FI	G. F. Zietsman, Posbus 263, Florida, Tvl.
*ZS6IC	should read Andries Engelbrecht.
*ZS6JC	D. R. Austin, 41 Shirley Road, Hatboro, Pennsylvania, 19040. U.S.A.
*ZS6LY	J. C. Krause, 3 Danford Street, Bethal, Tvl.
*ZS6TB	L. Kussman, 014 Lemey Court, c/r 1st and Berkwell Roads, Gresswold, Jhb.
*ZS6TK	B. N. Griffiths, 1 Eugenia Road, Wychwood, Germiston, Tvl.
*ZE1CZ	L. B. Wilkinson, 6/0 34A, 8th Avenue, Parktown, Waterfalls, Salisbury, Rhodesia.

SAN DIAGO AWARDS

A special award is available to amateurs for contacting five stations in San Diago between 1st October 1968 and 1st October 1969. Another is available for contacting the most W6s in San Diago for any country in the world. Each contact counts as one point. This may be of interest to our DXers, and also the Certificate Hunters Club, Chapter 3 (South Africa).

A SIDEBAND PACKAGE ZS STYLE

by E. P. Rosewarne ZS6WI

The transmitter to be described was built by the author to gain experience in the construction of sideband equipment. Readers familiar with previously described transmitters will recognise its similarity to both the sideband package of W6TEU, featured in the A.R.R.L. Sideband Manual, and the G2DAF transmitter. Due acknowledgement to these sources is accordingly made.

Before commencing such a project it is well to have a list of desirable features, and to include them in the original design, rather than include them as modifications at a later stage. Here then is what was required of the transmitter:-

1. Desk top single unit.
2. Bandswitched to cover the 80 to 10 metre amateur bands.
3. V.F.O. bandspread over each band to make full use of Eddystone slow motion dial.
4. Best possible carrier and unwanted sideband suppression.
5. Upper and lower sideband selection without carrier shift.
6. Peak limiting control.
7. Vox and anti-trip features.
8. Sufficient power output to drive linear amplifier or to operate by itself.
9. Highly stable V.F.O.
10. Stable and good quality amplitude modulation.
11. Regulated power supplies.
12. To be built from existing or readily

available components.
13. Symmetrical layout of panel controls.

These considerations may seem to some a bit ambitious and unnecessary. Certainly not many commercial transmitters would meet these requirements.

General Circuit Description

Reference to block diagram Fig. 1 shows a 450kc crystal oscillator driving a 7360 balanced modulator for carrier suppression. The double sideband signal from the balanced modulator is passed through the mechanical filter where the lower sideband is rejected. The output of the filter is amplified by an R.F. amplifier, the gain of which is controlled by the limiter tube, which samples the R.F. output of the transmitter. A sample of the 450kc carrier is taken from the crystal oscillator and fed to the 6X8 doubler where it is doubled to 900Kc. It is then either doubled to 1800kc or tripled to 2700kc., by a following stage of multiplication to become 4 or 6 times the original carrier frequency. It is now mixed with the amplified 450kc. output of the filter to give an output of 5 upper and lower sideband.

i.e.

4+1 = 5 Upper sideband. 2.25 meg.
6-1 = 5 Lower sideband. 2.25 meg.
This allows a choice of sidebands without any shift whatever in frequency.

AUDIO SECTION

A two stage speech amplifier feeds either the balanced modulator or the 6BE6 carrier amplifier for A.M. operation.

For C.W. and A.M. operation H.T. is removed from the balanced modulator while the 6BE6 comes into use as a carrier amplifier or modulator to insert a 450kc carrier or modulated carrier to the first mixer.

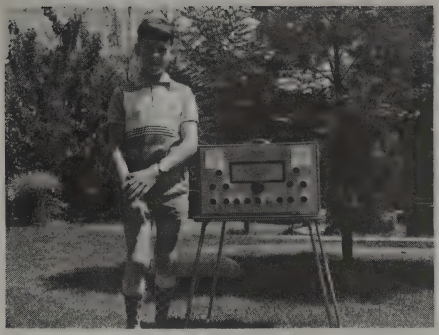
For A.M. operation audio is supplied to the suppressor grid of the 6BE6. giving an amplitude modulated output of good quality. Adjustments to the cathode resistor as well as to the 270k suppressor grid resistor of the modulator tube may be necessary to obtain full modulation. Once set no further adjustment will be necessary.

The 2,25meg. S.SB. signal is next mixed with the V.F.O. to give an 80 metre signal. For 80 metre operation this signal is amplified by the third mixer, operating as a straight amplifier, the 6AK6 driver, and the final 6146B. The V.F.O. tuning capacitor is ganged with a double tuned circuit to ensure a signal devoid of spurious radiations being fed to the final.

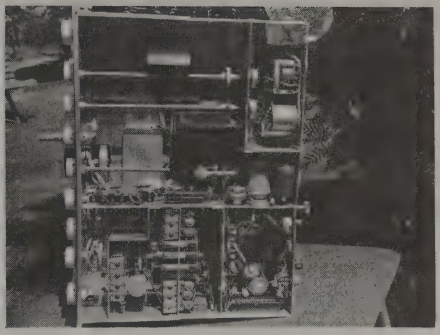
For operation on the higher frequencies the signal is heterodyned by a oscillator to the required frequency. A limiter, as mentioned previously, samples the output of the final and controls the gain of the amplifier preceding the first mixer. This limiter has a panel control allowing the threshold of control to be set to meet prevailing conditions.

Having given a general description of the transmitter, perhaps a more detailed description of the various stages and difficulties likely to be encounted will be in order.

Originally a cathode follower, followed the crystal oscillator, but it was found that a considerable amount of carrier was being injected into the heater wiring. No amount of by-passing would eliminate this. The feed through of



Chief Consulting Engineer on the Project Allan Bailey



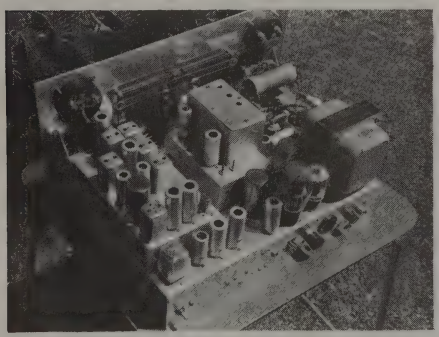
Underside View

R.F. degraded the performance of the balanced modulator to an unacceptable degree. The 7360 is capable of 60db. of carrier suppression, while the mechanical filter provides a further 22db. Every effort should be made to achieve these figures. The solution was to parellel the triodes of the 12AU7. crystal oscillator, and to put the cathode at earth potential by means of an R.F. choke.

Several circuits for the 7360 balanced modulator werre tried, but the one published in the R.C.A. Transmitting Tube Manual proved to be the easiest to adjust, as well as providing the best carrier suppression. Care should be taken to mount the 7360 away from the magnetic fields of transformers, chokes, relays etc.,

The anode coil consists of the primary of a 455kc I.F. transformer, the secondary being a link of 100turns of 5 core Litz wire. The final signal depends to a large extent on this stage, so care in the symmetrical layout of the components will be well worth while.

Difficulty is likely to be encounted with the various tuned circuits. It is very easy to tune the various doubler and tripler stages to the wrong resonance as peaks will be found only 450kc. apart. An accurate grid dip oscillator with a range extending down to 900kc. will be most useful. The I.F. transformers can be made from air-cored transformers of old scrapped broadcast receivers.



Top View ZS6WI

Top View ZS6WI

A little patience and perseverance will enable the correct coupling and resonance of these transformers to be attained.

When correctly adjusted, reducing the carrier by means of potentiometer R.C. reduces the 2.25 meg output of the mixer to zero in either position of the doubler/tripler. The 2.25 meg. signal measured across coil L.I. by means of a V.T.V.M. should be $1\frac{1}{2}$ to 2 volt. Until this figure is obtained it is of no use to proceed further.

Another difficulty likely to be experienced is the amplification of the 8th harmonic of the crystal oscillator, which will fall in the 80 metre band and beat with the desired signal. This can be eliminated by means of a paralleled tuned trap in the anode lead of the 6X8. doubler/tripler and a series resonant trap across coil L.I. The latter trap will detune coil L.I. making it necessary to repeat it after installation of the trap. By listening on a receiver it is possible to completely suppress this unwanted radiation.

It was decided to use an Eddystone slow motion dial for the V.F.O. as it is well suited to amateur sideband use. Unfortunately our amateur bands are not all of the same bandwidth so a compromise is unavoidable. 500kc. offers the best overall solution.
The amateur bands at present consist of the following:-

80 metre	3.5meg to 3.8 meg.
40 "	7.0meg to 7.150 meg.
20 "	14.0meg to 14.350 meg.
15 "	21.0meg to 21.450 meg.
10 "	28.0meg to 29.70 meg.

500kc will cover all the bands except 10 metres, and with the exception of 40 metres, the bands will occupy most of the dial space.

On 10 metres, 3 section, each 500kc wide, can be used. The fact that 200kc remain uncovered was not thought to be of great consequence. If it is desired to operate in this portion of the band, all that is necessary is to plug in a suitable crystal. A further advantage of using 500kc. is that with a reasonably linear V.F.O., 1kc, will equal one dial division, simplifying calibration. The Eddystone dial has a reduction ratio of 110 to 1 which allows for accurate zeroing of frequency, and with the flywheel loaded tuning knob allows spinning the dial from one end of the band to the other.

The main requirements of the V.F.O. are stability, a linear tuning rate, and a reasonably constant output over the 500kc. These requirements are met by a Colpitts circuit, a stabilised power supply, and solid construction. The value of the tuning capacitor is not critical, any value between 100pf and 250pf. being suitable. The frequency coverage can be adjusted by C.2. The larger the value of C.2. the less will be the effect of the tuning capacitor. A starting point in adjusting the frequency and coverage of the V.F.O. is to make C.I. the same value as the variable capacitor, and C.2. twice the value of the variable. If the band is cramped at the low end, C.I. should be reduced in value, or if too spread out, increase in value. After a uniform spread has been obtained, the 500kc. coverage is obtained by adjusting C.2. The frequency is adjusted by the inductance. The V.F.O. operates from 5.75 to 6.25 meg. If a cored inductance is used particular care must be exercised to avoid end and side float of the core.

The above operation may be time consuming but with a bit of perseverance the correct values will be obtained. The

FIG 1

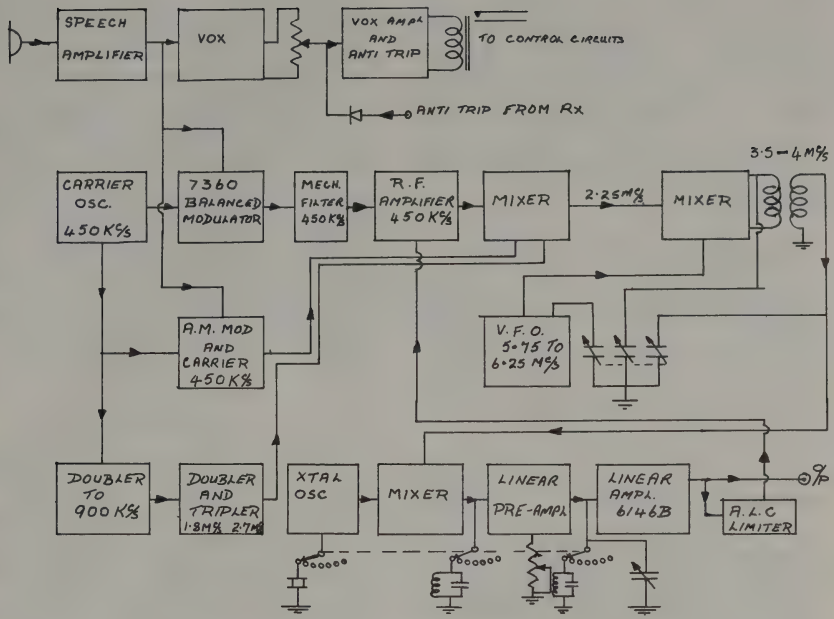
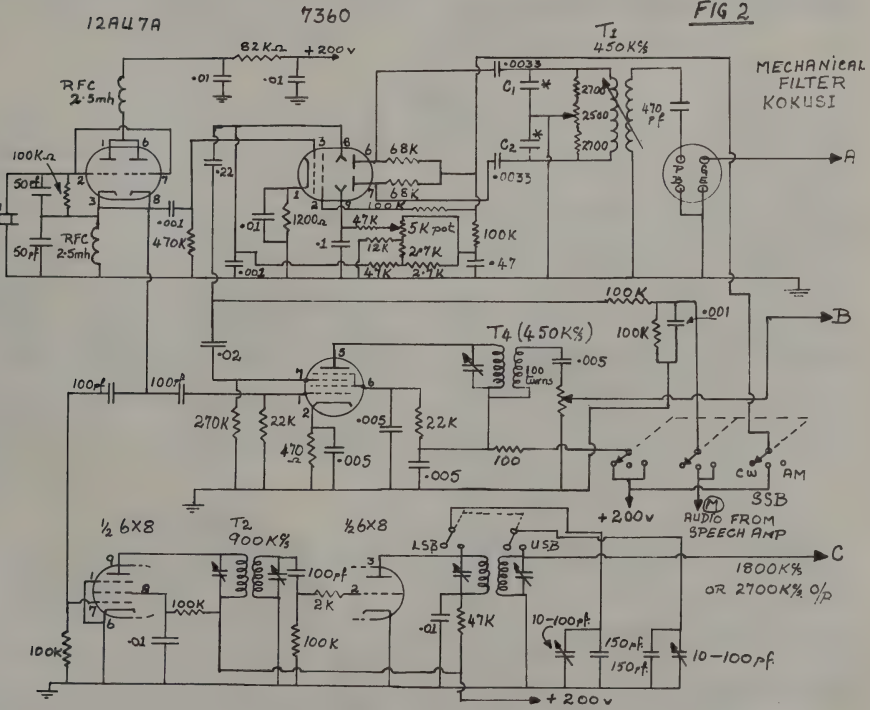

SPEECH AMPLIFIER
VOX
VOX AMPL AND ANTI TRIP
TO CONTROL CIRCUITS
ANTI TRIP FROM Rx
3·5 – 4 Mc/s
CARRIER OSC. 450 Kc/s
7360 BALANCED MODULATOR
MECH. FILTER 450 Kc/s
R.F. AMPLIFIER 450 Kc/s
MIXER
2·25 Mc/s
MIXER
A.M. MOD AND CARRIER 450 Kc/s
V.F.O. 5·75 TO 6·25 Mc/s
DOUBLER TO 900 Kc/s
DOUBLER AND TRIPLER 1·8 Mc/s 2·7 Mc/s
XTAL OSC
MIXER
LINEAR PRE-AMPL
LINEAR AMPL. 6146B
A.L.C. LIMITER
O/P

FIG 2


12AU7A
7360
82 KΩ
+200 v
RFC 2·5mh
·01
·01
·0033
C1 *
C2 *
·0033
T1 450 Kc/s
2700
2580
2700
470 pf
MECHANICAL FILTER KOKUSI
A
100 KΩ
50 pf
X1
50 pf
RFC 2·5mh
·001
470K
·22
68K
68K
100K
·01
1200Ω
·1
47K
5K pot
12K
2·7K
4·7K
2·7K
100K
·47
·002
100K
·001
B
T4 (450 Kc/s)
100 Turns
·005
·02
100pf
100pf
270K
22K
·005
470 Ω
·005
22K
·005
100
CW
AM
SSB
+200 v
AUDIO FROM SPEECH AMP
½ 6X8
T2 900 Kc/s
½ 6X8
LSB
USB
C
1800 Kc/s OR 2700 Kc/s O/P
100pf
100K
2K
100K
·01
·01
47K
10–100pf
150pf
150pf
10–100pf
100K
+200 v

output of the V.F.O. measured at the grid of the mixer stage with a V.T.V.M. should be 1.4 to 2 volts. To avoid overloading the mixer, the capacity divider can be adjusted to obtain this figure. Too much emphasis on solid construction of the V.F.O. cannot be made. The variable capacitor should be the best available.

BANDSWITCHING ASSEMBLY

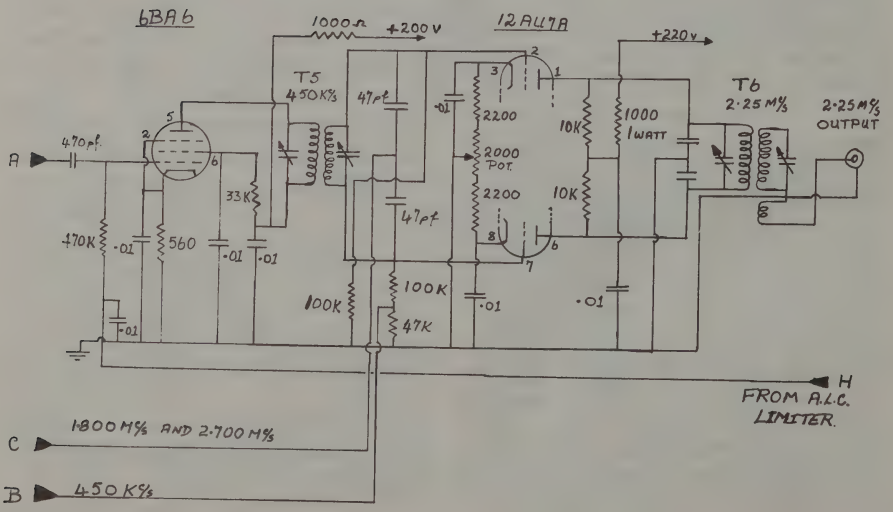
It will be found easier to build and align the crystal oscillator, driver, and final grid circuits as a sub-assembly before final assembly. The tuned circuits can be aligned with a grid dip oscillator.

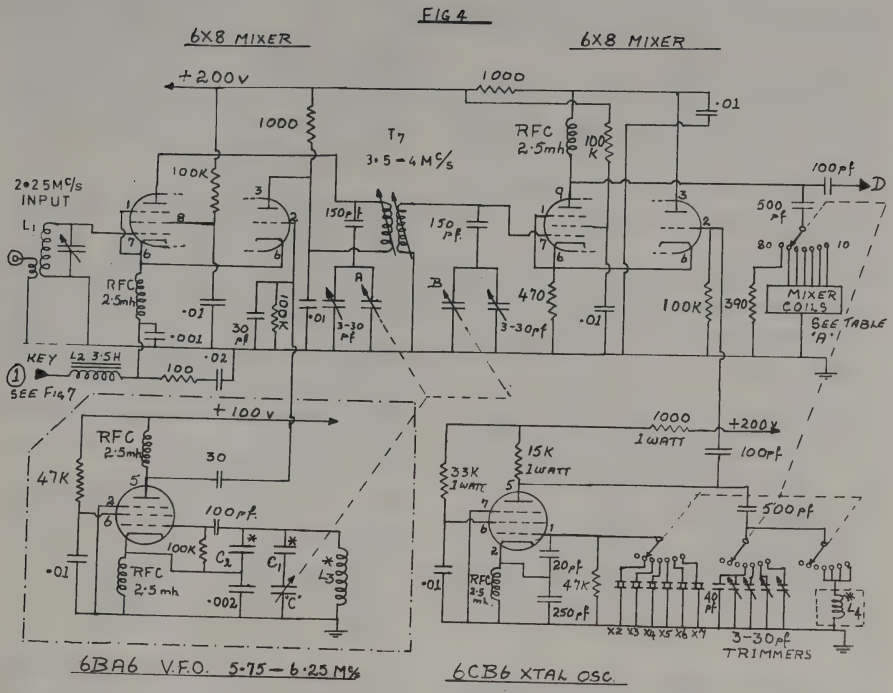
The driver and final stages should be built with the greatest care. Self oscillation of these stages must be avoided at all costs. A shield across the socket of the 6AK6, isolating grid and anode components, and the use of by-pass capacitors with zero length leads are obvious precautions. The socket of the 6146B. is mounted on $\frac{1}{2}$" pillars above the chassis. Each cathode pin is separately by-passed to earth by ceramic capacitors. Both the driver and final are neutralised. The neutralising voltage is developed across the 300pf. capacitor which isolates the grid circuits from earth. The value of this capacitor may have to be determined by experimentation as the distributed capacity will vary with different layouts. The accurate neutralisation of these stages is necessary for a clean undistorted signal.

6146B. Final

A geloso Pi-Section tank and switch assembly is used in the final. The loading capacitor for this Pi-section may cause certain difficulties. For an output impedance of 50 ohm on 80 metres a capacity of approximately 1200 mfd. is needed. If a suitable

FIG 3





variable with a minimum capacity low enough for use on 10 metres is not available, the situation can be met by using say a 1000 mfd. variable and switching in added capacity on the lower bands. Extra contacts are not difficult to add to the switch assembly.

A standard Imh. R.F. choke was used for the anode H.T. supply without running into resonance problems. Some builders may not be as lucky and will have to fit a non-resonant choke in this position.

METERING

It is not necessary to have more than one meter. However the author prefers to have a symmetrical panel arrangement wherever possible, so an extra meter was put on the panel to balance things up. This gives the added facility of being able to monitor two circuits similtaneously. The final is run in class A.B.-1. and does not draw grid current. Nevertheless the grid current is metered to guard against driving the final into the grid current region. The second meter is switched to read grid current, screen current, as well as the R.F. output. The D.C. for the latter is derived from a crystal diode and R.F. by-pass network at the Pi-section output. A O -200ma meter is used in the anode lead to the 6146B.

If it is impossible to obtain a "Break" before "Make" two pole three position switch, a two pole six position switch using alternate contacts may be used, for the meter switch. Reference to a handbook will enable reader to calculate the values of the shunts.

MECHANICAL FILTER

A Kokusai mechanical filter type M.F. 455 IOK is used. This filter has a design centre frequency of 455kc. and a bandwidth at 6db. of approximately 2.5kc. These figures vary with different filters, but an individual data sheet is given with each unit. This enables the passband and the carrier to be calculated.

The following "Rule of thumb" has been found useful in arriving at the audio bandwidth in restricted range audio systems.

Low frequency at 6db. down times high frequency at 6db. down - Constant "K". In other words as long as the low and high frequency are equally attenuated and their product remains a constant: quality will be maintained. The value of this constant varies with individuals but an average value is 600,000.

As the bandwidth of the filter is approximately 2.5kc. an audio frequency of coverage of 222 to 2700cs. should be suitable.

The data sheet of the filter used reads Centre frequency -0.07kc. Stated differently this means the centre of the passband is 0.07kc. below 566kc.

The low frequency at 6db. is given as -1.28kc. or 1.28kc below the design centre frequency of 455kc.

i.e.

455 -1.28kc.

453.72kc.

The upper frequency at 6db. is given as +1.15kc. above design centre frequency of 455. +1.15kc.

= 456.15kc.

The width of the filter at 6db. is therefore 456.15 minus 453.72kc.

i.e. 2.43kc.

The carrier could be placed 222kc. below the lower frequency of 453.73 kc. to give an audio spectrum of 222cs to 265cs. This is cutting the top a little bit too much, also the carrier placement would be too high on the slope of the graph.

By putting the carrier 300cs. below the lower frequency the audio range is extended on the high side to 2730cs. Thus the audio range at 6db. will be 300cs. to 2730cs., while the carrier attenuation by the filter will be improved to approximately 22db.

This gives an adequate and balanced audio response.

POWER SUPPLY

The power requirements of the transmitter are:-

400 volts D.C.	at	150ma.
200 " "	"	30ma.
100 " "	"	10ma.

A.C. mains fluctuations and a dislike of dropping resistors to obtain the lower voltages weighed the balance in favour of regulated power supplies. The components for such supplies do not take up much chassis space, and were in any case available in the junk box. The regulation and other advantages of regulated supplies are so superior to normal supplies that the extra effort was considered to be well worth while. Silicon diode rectifiers were used. The 200 volt supply is one taken from the A.R.R.L. handbook using a 6L6G. in place of an 807. as a series regulator.

The 100 volt supply for the V.F.O. utilises a single but highly effective regulator valve. It is a circuit designed for high quality, high gain audio equipment.

Details of its design and performance can be obtained in an article by J. R. Ogilvie in April 1963 Wireless World.

FIG 5

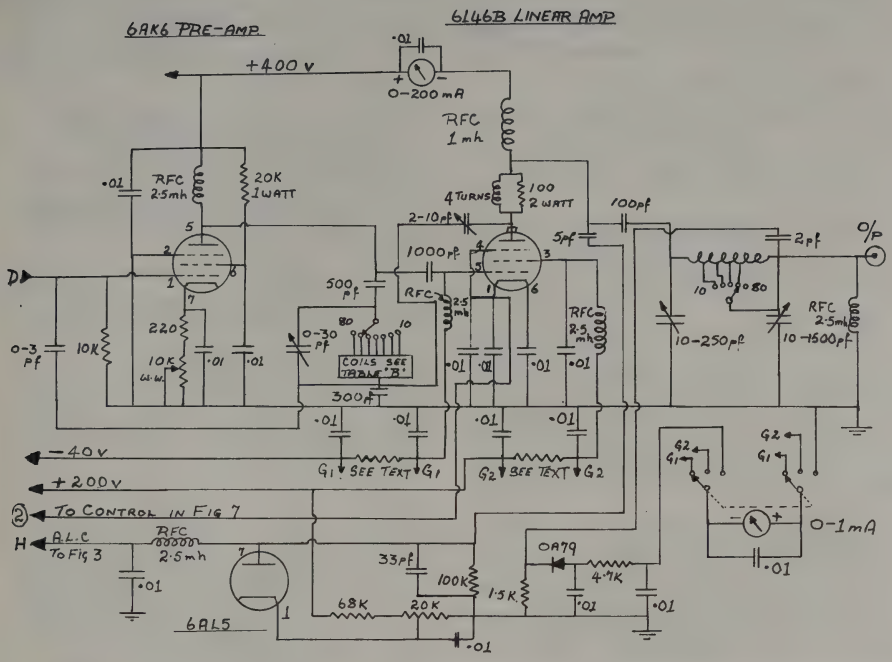
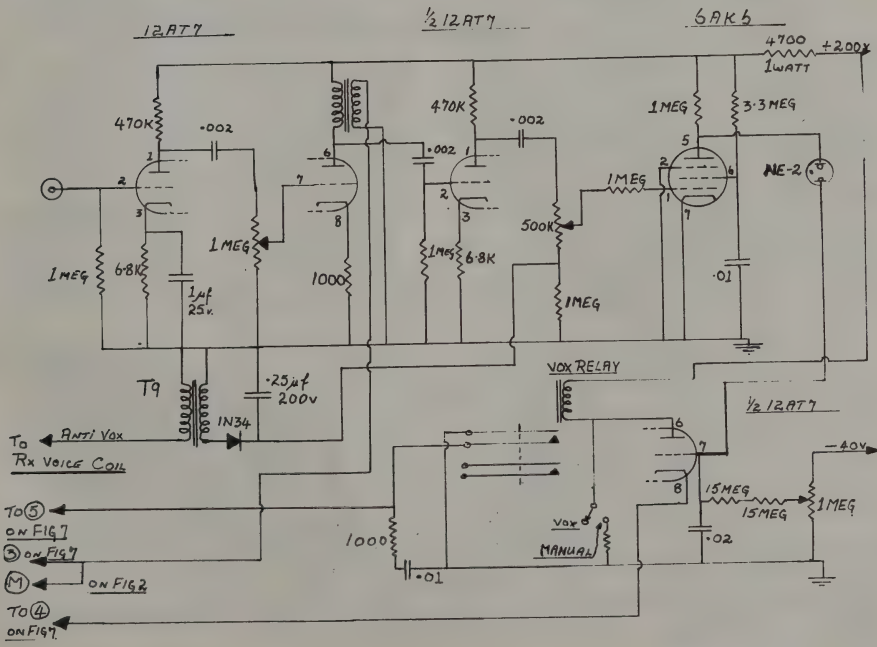

6AK6 PRE-AMP
6146B LINEAR AMP
+400 v
0-200 mA
RFC 1 mh
RFC 2.5mh
20K 1WATT
4 TURNS
100 2 WATT
100pf
2-10pf
5pf
2pf
O/P
1000pf
500 pf
0-30 pf
COILS SEE TABLE 'B'
300pf
220
10K
10K W.W.
0-3 pf
10-250pf
10-1500pf
-40v
+200v
TO CONTROL IN FIG 7
A.L.C TO FIG 3
G1 SEE TEXT G1
G2 SEE TEXT G2
0-1mA
6AL5
33pf
100K
1.5K
68K
20K
OA79
4.7K

FIG 6


12AT7
½ 12AT7
6AK6
4700 1WATT
+200v
470K
.002
1MEG
3.3MEG
NE-2
500K
6.8K
1000
.25µf 200v
T9
IN34
VOX RELAY
½ 12AT7
TO ANTI VOX
RX VOICE COIL
-40v
15MEG
15MEG
VOX
MANUAL
TO ⑤ ON FIG 7
③ ON FIG 7
Ⓜ ON FIG 2
TO ④ ON FIG 7

INDUCTANCES

T.1. 455kc. I.F. transformer with capacity across primary removed. C.1. and C.2. sufficient to resonate T.1. to carrier frequency.

T.2. 900kc. I.F. transformer made by removing approximately 28ft. from each winding of 455kc air-cored I.F. transformer.

T.3. 2.7 meg. transformer made by removing turns from 1500kc transformer alternately made by winding approximately 60 turns of 5 core Litz wire on form of I.F. transformer with 10 to 100 pf. trimmer.

T.4 455. I.F. transformer. secondary removed and replaced by 100 turns of 5 core Litz wire, wound over or adjacent to primary.

T.5. 455kc. I.F. transformer.

T.6. 2250kc. transformer made by winding approximately 70 turns 5 core Litz wire for each coil. Coupling coil is 4 turns over secondary.

L.1 80 turns 35 swg. enam. wire on $\frac{3}{8}$" diam slug tuned form. Coupling link is 3 turns over earth end.

L.2. 3.5h choke. No. 5634 from A.R.C. -5 receiver or similar.

T.7 40 turns No 34 enam. wire on $\frac{1}{2}$" diam slug tuned coil forms $\frac{3}{4}$" on centres.

L.3. 22 turns No. 26 wire on threaded ceramic form. See text.

L.48 17 turns No 18 enam. wire on $\frac{1}{4}$" form enclosed in shielding can.

TABLE "A" MIXER COILS

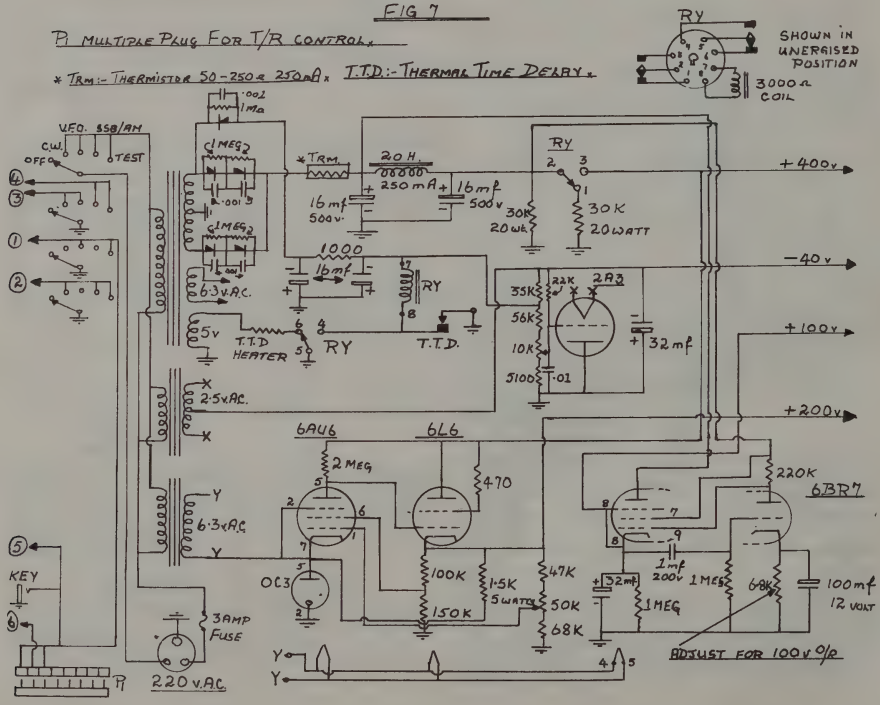
Each coil wound on $1\frac{1}{2}$" long $\frac{3}{8}$" polystyrene rod. Each coil shunted by 3 to 30 pf. trimmer.

BAND	COILS
40 metre	33 turns No 30 enam. shunted by trap of 80 turns No 36 enamel wire on $\frac{1}{4}$" diam. slug tuned form in series with 10 pf.

FIG 7

P1 MULTIPLE PLUG FOR T/R CONTROL.

* TRM:- THERMISTER 50-250Ω 250mA. T.T.D.:- THERMAL TIME DELAY.



20	"	24	turns	No 26	enam.
15	"	12	"	" 22	"
10	"	9	"	" 18	"
10	"	9	"	" 18	"
10	"	8	"	" 18	"

TABLE "B" 6AK6 COILS

Wound on 1" long $\frac{3}{8}$" diam polystyrene rod. Each coil shunted by 3- 30 pf. trimmer, unless otherwise stated.

BAND	COILS
80 metre	70 turns No 39 swg. enam. shunted by fixed 30pf.
40 "	33 turns No 30 swg. enam.
20 "	17 " " 22 " "
15 "	9 " " 18 " "
10 "	7 " " 18 " "
10 "	7 " " 18 " "
10 "	6 " " 18 " "

L.5 Geloso Pi section output tank coil with switch assembly. Loading capacitor 3 gang receiving type 500pf. per section, or 2 gand with added capacity switched in on lower frequencies. See text.

CRYSTALS

X.1. 453.42 See text
X.2. 3.1500meg.
X.3. 10.500meg.
X.4. 8.750 meg.
X.5. 12.250meg.
X.6. 12.500meg.
X.7. 12.750meg.

References:-

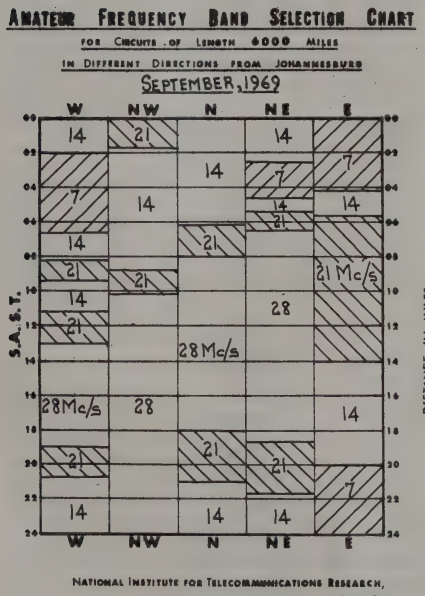
Q.S.T. June 1958.

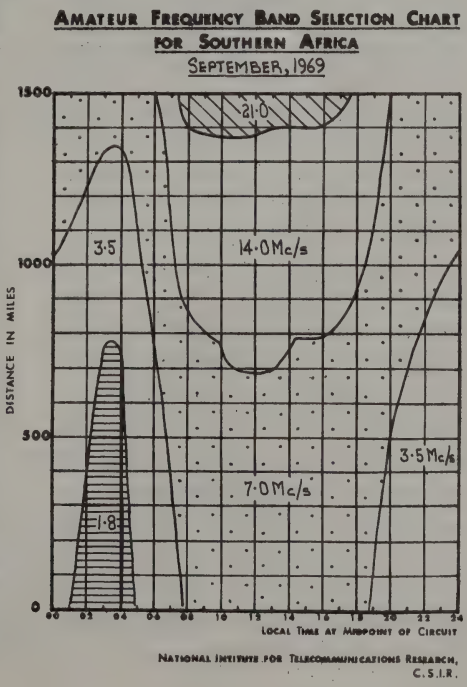
A.R.R.L. Sideband Manual and Handbook.

Wireless World. April 1963. H.T. supplies for high gain amplifiers. J. R. Ogilvie.

R.S.G.B. Bulletin. G2-DAF. SSB. transmitter Mark 2.

FREQUENCY PREDICTION CHARTS





SIX METERS – A MOST INTERESTING BAND
by DAVE L. CRAWCOUR ZS 6ADZ

There are, it may be assumed, many amateurs who are interested in V.H.F. and the following it is hoped will result in more activity, particularly on the 50 Mhz portion of the spectrum which has been allocated for use by amateurs.

The excuse, or reason, usually advanced by those OM's who are in possession of equipment suitable for transmitting and receiving on 6 meters, and who do not operate is either, "I listened and listened but heard nothing" or "I called and called but no one came back to me." That may very well be the case, but it must be born in mind that activity on the 6 meter band is confined to a comparatively small group of enthusiasts in the larger centres of the Republic, Rhodesia and South West Africa. These contacts are mainly of a local nature in these centres, and take place at times suitable to those concerned. There is however, a small group of V.H.F. enthusiasts in in Bulawayo, Transvaal, O.F.S. and one in Natal, who, for some months past have been, and still are conducting tests from Mondays to Fridays between 6.00 and 7.00 a.m. local time, and at midday and in the afternoon on Sundays. On all these occasions there is a back up link on either 7 or 14 Mhz. This group is concentrating on 50 Mhz with some fairly good results.

Most of the stations operating on this band are Xtal-controlled, but one or two have V.F.O. facilities. The frequencies generally in use are between 50.000 and 50.136 Mhz.

Whilst it may not be generally known, ZS6NM in Potchefstroom and ZE1AN in Bulawayo have both had two way contacts on 6 meters with ZS3E in Luderitz. Then again ZE1AN and ZS4SA have both worked SV1AB in Athens, cross band 50 and 21 Mhz, as SV stations are not permitted to operate on 6 meters. So much for some of the longer distance contacts which have been made.

On Monday evenings commencing at approximately 1915/1930 SAST, a 6 meter net has been in operation for some time, mainly between stations in the Southern Suburbs of Johannesburg, other stations in Johannesburg, Meyerton, Sasolburg, Parys and Potchefstroom. Whilst Monday evenings is our usual weekly get-together, there are those of the fairly regulars who operate on other evenings of the week from 1915 SAST onwards.

The following is a list of stations which have been contacted on 6 meters from Rosettenville. Some of these stations operate very regularly, others not so:-

ZS4SA	Sasolburg
ZS4CN	Parys
ZS4UH	Kroonstad
ZS6AA	Glendower
ZS6ADZ	Rosettenville
ZS6AHW	Linden
ZS6APQ	Turffontein
ZS6AMC	Roseacres
ZS6ANZ	Discovery
ZS6AQW	Kenilworth
ZS6ASY	Turffontein

ZS6AEW	Mondeor
ZS6BKV	Mondeor
ZS6BJX	Discovery
ZS6BKX	Roodepoort
ZS6GX	Germiston
ZS6HW	Vereeniging
ZS6IN	Meyerton
ZS6MM	Parkview
ZS6NM	Potchefstroom
ZS6RG	Turfontein
ZS6YQ	Kempton Park
ZS6EU	Dunvegan
ZS6UR	Greenside
ZS6V	Hill Extension

The signal reports exchanged with most of these stations from the shack of the writer are 5 and 9 both ways. Kroonstad is still being fairly regularly worked, but on account of the longer distance, reports fluctuate between 3/3 and 5/9 depending on conditions prevailing at the time.

Six meters is an ideal band for local and cross-town QSO's, and can be fairly well relied upon for distances of up to 60 miles or so. The use of this band also avoids cluttering up the recognised DX bands on which local QSO's can at times be quite a nuisance.

The two 50Mhz beacons ZE1ASC and ZS6VHF on 50.046 and 50.100 Mhz respectively (although ZS6VHF has not been in operation for some weeks now) have proved to be a boon to the V.H.F. group.

Most of the stations operating on band use transmitters with quite low power, 20, 35, 45 watts, but a couple of stations are running 100 and 150 watts. Beams are fairly essential. The writer has experimented with dipoles, folded dipoles, cubical quad, and is now using a four element wide spaced yagi which is giving far better results than any of the others previously tried.

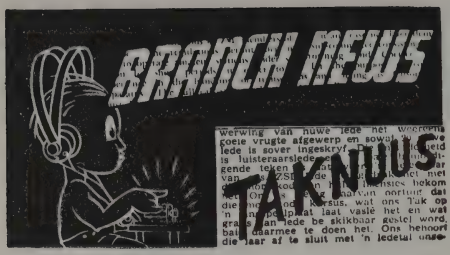
The following stations also operate regularly on six meters:-

ZE1AN	ZE7JX
ZE1AA	ZS3E
ZE1JJ	ZS5OA

More beacons would be of considerable value and assistance to the V.H.F. group, and any individual, or groups in the larger centres such as Durban, East London, Port Elizabeth, Cape Town, Kimberley, Bloemfontein and Pretoria, who are interested and keen enough to place a beacon on the 50 Mhz band will be doing a fine service. This suggestion if followed up would be of inestimable value to V.H.F. enthusiasts, to the "old timer" and perhaps more so to the "new comer" to 6 meters. In my own case, ZS6VHF has in the past been of great value in checking up, particularly in so far as the receiver and converter were concerned – to know that without doubt that they were actually functioning as they should be. I know that this is also true in the case of others who have started out on 6 meters.

Beacons also furnish a reference point for calibrating or plotting frequencies, and this is most essential on the 6 meter band, particularly when looking for DX contacts. The value of beacons to those engaged in DX contacts – to those who are continually on the lookout for openings in the band, would be greatly appreciated – just to know for certain that there is a signal on the air, on a given frequency, all the time.

Whilst this is only a suggestion, could it perhaps be made an appeal to those interested in V.H.F. in the larger centres, or for that matter to anyone anywhere, to think and perhaps act on these things.



TAK BOLAND

Sedert ons kwartaal-vergadering wat op 24 Mei te Gordonsbaai gehou was, is dit blywend om te meld dat daar tot op datum heelwat van die ou osse is wat terug is in die kraal. Onder hulle kan selfs stigterslede getel word van Tak Boland en hierdie herlewing is, soos u seker maklik sal begryp, 'n riem onder die hart van die nuwe komitee.

Laasgenoemde bestaan uit die volgende:

O.K. Dan ZS1DF Voorsitter
" Dennis ZS1NU Visevoorsitter
Sy L.V. Ann ZS1 199 Tesouriere
Heléne ZS1PJ Sekretaresse

met die twee skakelbeamptes Louis ZS1VD en Pierre ZS1NP om alle waarhede en naarhede bekend te maak.

Bogenoemdes, sowel as alle lede, voel dankbaar vir die prysenswaardige werk van die vorige komitee — hulle diens gedurende die afgelope jaar maak ons program vir die komende maand dus te makliker.

Die volgende kwartaal vergadering word by die du Toitskloof Hotel gehou op Saterdag 16 Augustus, gevolg deur 'n dinee en dans vir diegene wat dit verlang.

Na die pitkos van die vergadering het die sosiale aspek 'n kenmerkende deel van die ‚agende' geword, soos die bootrit by Gordonsbaai ook treffend bewys het. Sodoende wend ons pogings aan om op karakteristieke wyse kwartaal vergaderings genotvolle gebeurtenisse vir die amateur se hele gesin te maak.

Twee komitee vergaderings is reeds gehou nl. by die QTH's van Dan IDF en Pierre INP op Elgin en Nuy respektiewelik, om die plan van aksie op te stel. Laasgenoemde is so volop soos die spreekwoordelike weduwee se kruik; ek kan die aanstip, maar wat bly oor vir u pen in Radio ZS?

Groete van Tak Boland
Pierre ZS1NP

TAK NOORD-TRANSVAAL

Tak Noord-Transvaal het sy Algemene Jaarvergadering op 28 Junie 69 in die Didakta-gebou, Pretoria, gehou om sy nuwe Bestuur te kies. Die volgende OKs is sonder enige teëstemme gekies:-

Charles Stiemie ZS6CZ Voorsitter
Willie Lotter ZS6BDM Onder-Voorsitter

Gert Terblanche ZS6BIK	Sek/Tesourier	
Harry Blomerus ZS6BDZ	Redakteur: Teënspanning	
Roelf Kloppers ZS6ATK	Organiseerder: Voortrekkersaamtrek op die Lug	
Tinus Lande ZS6TL		Lede
Albert le Roux ZS6AXL	Tegniese Redakteur	
Mauritz Olivier ZS6MR	Fondse-insameling	
Tienie Coetzee ZS6BAN	Skakel met Radio-ZS	

Toe TNT oorspronklik gestig is was OK Charles as ons eerste Voorsitter gekies, en hierdie jaar het die geskiedenis homself herhaal. Ons is baie bly dat OK Charles hom die amp weer eens laat welgeval het, want ons weet dat hy nog al die jare met geesdrif in ons Tak belang gestel het en dat ons ten alle tye op hom kan staat maak.

Soos in die verlede het OK Hennie Steynberg ZS6BLT weer sy dienste as Ere-Ouditeur aan die Tak beskikbaar gestel. Dankie Hennie! Ook OK Harry ZS6BDZ is weer as Redakteur van Ons takblaadjie Teënspanning gekies. In die verlede het OK Harry baie moeite gedoen, nie net om toe te sien dat Teënspanning gereeld verskyn het nie, maar ook dat daar altyd iets interessants in was. Welkom Harry! Jy het 'n onbenydenswaardige taak. OK Tienie ZS6BAN is weer aangewys as takskakel met Radio-ZS. Hierdie Jaar is die Retief-beker aan hom toegeken.

Aan OK Chris ZS6AIN, ons vorige Voorsitter, sê ons hartlik dankie vir die dienste deur hom gelewer. OK Chris het nou sy QTH na Kemptonpark verskuif en kon homself weens omstandighede nie weer verkiesbaar stel nie.

Gedurende die AJV-pouse het die LVs ons op lekker koffie, tee en smulgoed getrakteer, en na afloop van die vergadering het die OKs, hul LVs en juniors op OK Willie ZS6BDM se QTH toegeskaf waar hulle 'n baie gesellige en geslaagde braaivleis gehou het.

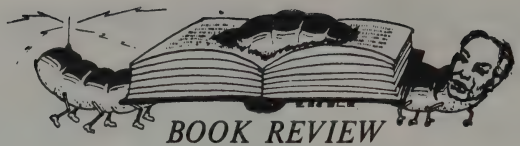
Op Woensdagaand 3 Julie 69 het die nuwe komitee dan ook sommer sy eerste vergadering aan die QTH van OK Roelf ZS6ATK gehou. Ten spyte van die feit dat sy LV Rina daardie aand baie olik gevoel het, het sy ons nietemin gul onthaal, en ons sê aan haar baie dankie.

Ons wens die volgende nuwe lede baie hartlik welkom in ons midde en hoop dat hulle sommer gou tuis sal voel:- Lu Eckard ZS6BCQ, Karel Jordaan ZS6BCM, Gerhard Zietsman ZS6FI, Dirk Fourie ZS6ALO, Jan Bauman ZS6-511 en Johan Marais ZS6-512.

OK Charles is nog hard besig om sy draagbare sendertjie op te knap – glo iets met die modulator verkeerd. Deesdae hoor ons OK Gert net op mobiel. Mooi sein, Gert, maar wanneer maak jy daardie tuissender reg? OK Tienie het ook nou vir hom 'n klein draagbare sendertjie aangeskaf – een wat OK Harry destyds gebou het en waarvoor OK Gert 'n transistorkragbron gebou het. OK Tienie het so pas vir hom 'n 40-meter tweepoolantenne opgerig – net hoog genoeg bo die grond sodat sy LV dit nie vir 'n wasgoeddraad kan gebruik nie. By die tyd dat hierdie berugie verskyn sal OKs Tinus ZS6TL en Barney ZS6YH ook al weer van vakansie af terug wees. Ons het albei OKs daar uit hul onderskeie vakansie-oorde gereeld op die lug gehoor.

Ons hartlike gelukwense ook aan OK Mannie de Beer ZS6AK en sy LV Koekie met hul seuntjie wat op 2 Julie deur die ooievaar afgelewer is.

M. B. Coetzee (ZS6BAN).



BOOK REVIEW

by Colin Duff ZS1CA

Working with Semiconductors
by Al Saunders
published by Tab Books.
No. 501. June 1969.

With the accent these days on semiconductors, it is only natural that the majority of new books received, would deal with this subject. It must be most difficult for an author to take a new approach in putting over the subject in order to acquaint a Technician or Hobbyist with a thorough understanding of Semiconductors. Al Saunders, a Veteran Technician, has indeed managed to expose the many facets of semiconductors in a different light. This book avoids the dry theoretical mathmatical explanation — it simply tells how and why a circuit works, backed up by large clear illustrations, and accompanied by component values for construction minded readers. Furthermore, the reader is invited to carry out each illustration in order to check in a practical manner, the function of the circuit. There can be no quicker way in understanding the performance of a transmitter if this is done.

The author begins with a clear-cut explanation of simple junction diodes, N and P type semiconductors as well as PNP and NPN Transistors. The next chapter outlines simple but reliable tests and operating parameters. Chapter 3 describes basic circuit configurations and compares them to vacuum tube equivalents. The effects of temperature and biasing are treated in Chapter 4, along with basic feedback techniques and curve tracing. In Chapter 5 the author begins to put things together — inter-stage coupling, impedance, matching, temperature compensation — and continues in Chapter 6 with actual practical circuits — Class A and B amplifiers, complementery PNP-NPN circuits, phase inverters etc. Chapter 7 goes into RF and IF amplifiers, detectors, A.V.C. etc., more advanced circuits are covered in Chapter 8, preceded by an introduction to transistor oscillators, multivibrators and trigger circuits.

Succeeding chapters deal with power supplies, high frequency circuits, field-effect transistors, unijunction transistors, tunnel diodes, SCR's plus a dozen or so special purpose circuits designed for a variety of applications from audio amplifiers to zener diode functions (all accompanied by component values for construction minded readers). This book of 15 Chapters, 224 pages and over 185 illustrations is highly recommended as a practical introduction to semiconductors.

JUBILEE INTERNATIONAL LZ DX CONTEST 1969

The Jubilee International LZ DX CONTEST 1969 is organized by the Central Radio Club of Bulgaria to mark the 25th anniversary of the liberation of Bulgaria from fascism.

All short wave radio amateurs the world over are kindly invited to take part in this event which is aimed at making more friendship.

Duration: from 00.00 GMT to 12.00 GMT on Sunday, 7 September 1969.

Bands: 3.5, 7, 14, 21 and 28 MHz.

Modes: SSB and CW as separate sections.

Call: CQ LZ TEST.

Exchanges: RS (T) reports plus serial number of QSO starting from 001 irrespective of the band used. Each station may be worked once per band.

Multiplier: the countries worked according to the DXCC Countries List.

Entries: single operator and multi-operator (single transmiter) entries are provided for both SSB and CW sections.

Points: contacts with stations in the same continent count ONE point, with stations in other continents — THREE points. Each contact with an LZ station counts FIVE points. Stations in one's own country may be worked for multiplier credits only, and no QSO points may be claimed. No crossband or cross-mode contacts count for scoring purposes. No QSO points are earned if a mistake has been made in the exchange or the call-sign of the station worked. If a mistake has been made in a contact with a station from a country which is the only one on the band, it counts as a multiplier and no QSO points may be claimed. Only countries from which contest logs have been received count as multipliers.

Score: the sum of QSO points on each band is multiplied by the number of countries worked on that band to obtain the Band score. Final score is the sum of all Band scores.

SWL's receive points as follows: ONE point may be claimed for correct reception of both call-signs of the stations being in contact and one of the exchanges, and THREE points for both call-signs and both exchanges.

Classification: separate classification for the SSB and CW sections for each country, for each continent and general classification separately for single and multi-operator entries are provided. There will be general classification for all SWL's.

Awards: Participants who occupy 1st, 2nd and 3rd place in the respective categories will be awarded a Certificate and a special Contest badge.

The first three top-scorers out of all participating will receive presents in the Bulgarian national style.

Participants from Europe who contact at least 25, and participants outside Europe who contact at least 10 different LZ stations will be awarded a special Jubilee Diploma. For this purpose the LZ contacts claimed should be listed separately in the contest log.

Logs: Participants should send contest logs following the pattern shown below, separately for each band, as well as a declaration that they have observed the Contest rules and their national regulations. The contest logs should be posted not later than 1 October 1969 to:

P. O. Box 830, Sofia, Bulgaria

Time GMT	Band MHz	Station worked	Exchange		Points	Country multiplier
			sent	received		

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KW ATLANTA

HIGH POWER TRANSCEIVER for MOBILE & FIXED STATION OPERATION ON ALL AMATEUR BANDS FROM 10 to 80 metres

* BUILT IN NOISE LIMITER * 500 WATTS P.E.P. INPUT
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* FULL P.T.T. OPERATION * CALIBRATED 'S' METER
* AUTOMATIC LINEARITY CONTROL * GRID BLOCK KEYING
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* DIMENSIONS 10½" WIDE, 5½" HIGH. 13½" DEEP.

Price: R498.00

FEATURES

The KW Atlanta transceiver follows a long line of very popular high quality equipment for the discerning radio amateur. It falls into the higher power category and is intended for the amateur seeking good performance with moderate cost. The K.W. Atlanta is designed for optimum performance on upper and lower sidebands and offers peerless operation in the CW and AM modes. Construction of the K.W. Atlanta lives up to the very high standard of engineering now generally associated with K.W. products, and once again particular attention has been paid to physical and electrical stability of the circuit.

The SSB generator and receiver filter feature a steep slope crystal filter giving superior audio quality. Automatic linearity control on transmit limits "flat-topping" and the "grid-block" system of keying ensures a good keying characteristic for the C.W. man.

A precision British dual-speed tuning assembly facilitates dial movement to the desired band segment and a smooth low-speed drive for positive vernier tuning.

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H. Q. NOTES
H. K. NOTAS

As OM Herman Forrer, ZS1FT, is unable to provide the usual Headquarters Notes through illness, it is hoped that the following extracts from Headquarters Bulletin will prove of interest to our readers. We are sure that all our readers wish OM Herman a speedy recovery to full health.

WORLD RADIO CONFERENCE:

We are informed by Calendar Number 78 of the International Amateur Radio Union that June 7, 1971, has been designated by the International Telecommunication Union as the opening date of the World Administrative Radio Conference for Space Telecommunications to be held in Geneva. It is expected that the conference will be in session for about six weeks. While the conference is for the purpose of bringing the International Radio Regulations up to date and to provide for the use of space radio techniques and the agenda does not mention the amateur radio service, there is no reason for us to be complacent about its effect on our hobby. There is one item on the agenda which requires the Conference to consider, revise and supplement as necessary, the existing Table of Radio Frequency Allocations in the Radio Regulations for Radiocommunication services, in so far as they may use space radio techniques and the radio astronomy service, which may well cause some of the nations who are not so well disposed to amateur radio to inquire into the use which is being made by amateurs of our frequency allocations in the VHF and UHF areas.

RADIO AMATEUR SATELLITE CORPORATION:

Recently a group of Washington, D.C. area amateurs formed the Radio Amateur Satellite Corporation (AMSAT). The organisation has affiliated with A.R.R.L., and is similar in purpose to Project Oscar, Inc. A goal of AMSAT is to provide long-term communication satellites for amateurs to carry on international communications similar to as now exists in our HF bands. One of the initial tasks undertaken by AMSAT is to secure a launch for the Australis-Oscar satellite, a beacon-type satellite transmitting in the 10 and 2 metre bands. Initial overtures have been encouraging and an autumn launch is hoped for.

AMSAT invites the participation of groups and individuals from all over the world. Further information is available by writing to Dr. Perry I. Klein, K3JTE, President, Radio Amateur Satellite Corporation, P.O. Box 27, Washington, D.C. 20044, U.S.A.

FRENCH LAW:

We are sure that our members will not only be interested in the following information but also envious of the French Amateurs. "French Amateurs have solved the problem of gaining permission to erect an amateur antenna when living in an apartment. Through the work of the French Amateur Society by R. Brochut, F9VR, a law

was passed by the National Assembly which forbids the proprietor of an apartment building from opposing the installation of amateur antennas."

INTERNATIONAL AMATEUR RADIO

A summary published by the I.A.R.U. of the annual reports submitted by the member societies show some interesting and in some cases surprising facts about amateur radio throughout the world. The Russian amateur society has the largest membership with a total of 114,000 members, followed by the A.R.R.L. with 98,000 members. These are followed by Jugoslavia with 30,000; Japan with 28,954; Germany with 19,705; Brazil with 17,272 and the United Kingdom, that is RSGB, with 14,500. No other society out of the 81 which submitted reports has a membership running into five figures.

The total number of amateur stations licensed in each country shows a rather different picture with the USA well in the lead with a total of 266,000 stations, this is followed by Japan with 76,120. Russia is well behind with 15,085 stations; Germany with 14,190; Argentina with 14,000; Brazil with 12,534; Canada with 12,502 and the United Kingdom with 12,300.

The percentage figures of licensed stations which are members of the national society are also very interesting, particularly among the countries quoted above with the large total figures. Here we find that in the USA only 29% of the licensed stations are members of the A.R.R.L. In Russia the position is slightly better with a percentage of 33%; Japan also shows 33%. The United Kingdom figures show that 61% of the licensed amateurs are members of the RSGB. Germany has a percentage of 82%; while Brazil shows up the best of the top figure countries with 96%, while Argentina has only 10%, and Canada 25%. The countries with the smaller Amateur populations show the best percentage figures. Several show that all the licensed amateurs are members of their national societies, such as Algeria, Bolivia, Bulgaria, Burma, Ceylon, Faroe Islands, Finalnd, Liberia, Malaysia, Monaco, Mozambique, Nicaragua, Portugal, Surinam, though we suspect that is some cases the hundred percent figures are due to compulsory membership of the national society.

The age limit for a license varies from no restriction in 23 countries with most countries settling for 16 and 18 years of age.

The maximum power input also showed a wide variety with 21 coun- allowing a kilowatt, one country 1250 watts and two countries 2 kilowatts.

Twenty countries allow the same as we have, that is 150 watts, while 2 countries, Nigeria and Spain allow only 50 watts.

Third party traffic is allowed in 18 countries, while 29 countries show that citizenship is not necessary for the issue of a licence.

NEW AND RE-INSTATED MEMBERS:

We wish to welcome the following new and re-instated members to our ranks and hope they will be with us for many years:

W6VFR — M. H. Gonsier — Associate Member

ZS6-177 — S. J. du Plessis — Johannesburg Branch

ZS6-225 — D. R. W. Hutchinson — Pretoria Branch

ZS6-226 — S. M. de Wet — Pretoria Branch

ZS6-227 — C. T. Christodoulou — Pretoria Branch

ZS6-228 — L. van Niekerk — Pretoria

Branch
ZS6-229 — P. T. Whitworth — Pretoria Branch
ZS6-176 — H. Goldberg — Johannesburg Branch
ZS1CH — S. H. Walters — Tak Boland
ZS6-191 — P. W. v. d. Elst — Johannesburg Branch
ZS1IA — G. A. Eastland — Johannesburg Branch
ZS6KS — R. Payne — Johannesburg Branch
ZS6LY — J. C. Krause — Eastern Transvaal Branch
ZS3-046 — J. J. Snyman — South West Africa Branch
ZS4VU — XYL I. M. J. Peacock — Pietermaritzburg Branch
ZS1LK — M. J. MacGregor — Tak-Boland
ZS2AP — C. R. Wickham — Port Elizabeth Branch
ZS6-178 — S. D. Gluckman — Johannesburg Branch
ZS6-179 — XYL M. J. Gluckman — Johannesburg Branch
ZS2-081 — C. W. Barrett — Port Elizabeth Branch

BRANCH COMMITTEES:

We are pleased to announce that the East Rand Branch elected the following to their Committee for the 1969-1970 year:-

Chairman: *Mike Rowland, ZS6AFG*
Vice-Chairman: *Mac McCormick, ZS6EC.*
Hon. Secretary: *Jack Adendorff, ZS6-007.*
Hon. Treasurer: *Peter Burger, ZS6-081.*
Members: *Les Haarhoff, ZS6AAU*
Tony Kahn, ZS6-012
Gert Roux, ZS6AYU
Scribe E.R.B. Barrier:- *Stan Nell, ZS6BJB.*

We are pleased to announce that the following were elected by Tak Noord Transvaal as their new committee at their Annual General Meeting.

Chairman: *Charles Stiemie, ZS6CZ.*
Vice-Chairman: *Willie Lotter, ZS6BDM.*
Secretary/Treasurer: *Gert Terblanche, ZS6BIK.*
Members: *Tienie Coetzee, ZS6BAN.*
Albert Le Roux, ZS6MR.
Tinus Lange, ZS6TL.
Roelf Kloppers, ZS6ATK.
Editor Teenspanning: *Harry Blomerus, ZS6BDZ.*

On behalf of our members we offer the new committees our congratulations on their election and wish them and their branches a successful and happy term of office. To the retiring committees we offer our thanks for their good work on behalf of their branches and our League.

MOON MISSION

Recently we have felt a sense almost of wonder at the efficiency and reliability of the communications between the space travellers and Earth. In fact the reliability of the communications throughout the whole space programme has been so perfect that it is taken for granted and the average citizen is not conscious of the importance of the various communications links and the part which they play in the success of the space programme. An article by Howard W. Kelley, K4DSN, in the June issue of CQ gives some very interesting information about the communications sub-system aboard the Lunar Module. This sub-system is capable of three two-way combinations of in-flight or lunar surface radio links; Lunar Module to the orbiting Command Module, Lunar Module direct to Earth and Lunar Module to the astronauts who are roaming about the Moon's terrain. The frequencies used are:-

S band Transmit – 2282.5 mc
S band Receive – 2101.8 mc
VHF Channel A – 296.8 mc
VHF Channel B – 259.7 mc

In flight when the Lunar Module is on the earth side of the moon and separated from the Command Module, communication with Earth is handled on S band, but between the Lunar Module and the Command Module information is passed back and forth on VHF.

As in the Apollo S band system a multitude of information sources on the Lunar Module can be transmitted and received at the same time, on the same antenna and often on the same frequency. Lunar Module to Earth S band links contain voice, TV, digital uplink ranging code signals, biomedical and systems telemetry data.

S-band voice is the primary means of communication between Mission Control and the two men aboard the Lunar Module. Back-up voice from Earth is possible using the digital uplink channel but this is usually tied up keeping the Lunar Module's guidance computer up-to-date.Biomedical data pertinant to astronaut heartbeat is transmitted by the Lunar Module (so earth bound doctors can monitor and record the physical condition of the spacemen), as is telemetry, voice (using redundant S band equipment) and in case voice capability is lose, an emergency key is provided for CW communication to the Manned Space Flight Network. Most of the same information can be exchanged between the Lunar and Command Modules that can be sent directly to Earth from the Lunar Module. However these communications are carried out on VHF. Normal voice chatter goes out on 296.8 mc simplex. Backup is accomplished on 259.7 mc simplex. VHF ranging which is initiated by the Command Module uses both VHF channels as a duplex operation.

When the two orbiting space-craft are behind the moon contact with Mission Control is not possible. Simplex voice is maintained over the 296.8 mc circuit between Lunar Module and Command Module at this time while telemetry data is fed over channel B into tape recorders aboard the command ship to be stored and retransmitted to Earth at 32 times the original recording speed when radio conditions between Earth and Moon improve. When the Lunar Module has planted its legs into the Moon's crust, the orbiting Command Module will use its S-band system to talk to Earth and VHF to maintain communications with the astronauts who are on the lunar surface. The Lunar Module then becomes the world's most expensive fm/am repeater. The Lunar Module takes the VHF voice, converts it to S-band and re-transmits it to the space network of Earth receiving stations.

QSL BUREAU:

The following QSL cards were dispatched during the past four weeks.

Division	ZS5	1539
"	ZS6AA	1432
"	ZS6AAA	379
"	ZS6BAH	337
"	DX	2437
		6124

THE PACIFICA AWARD

The Coastside Amateur Radio Club announces that the PACIFICA AWARD has been created in commemoration of a historic discovery on November 6, 1769, as Captain Gaspar de Portola and members of his expedition looked out across a ridge 1200 feet above sea level and marveled at the spectacular sight of the world's largest harbor . . . .SAN FRANCISCO BAY.

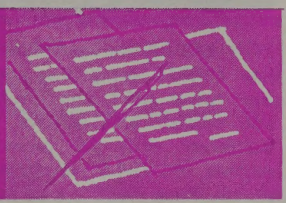
This award is available to any amateur or s.w.l for working or hearing two (2) members of the club on any band and mode between May 6 and November 6, 1969.

Send QSL card with call letters and dates worked plus 2 IRC to CARC, 812 ARGUELLO BLDV., PACIFICA, CALIFORNIA 94044.

All CARC members will call CQ as for example:

WA6PJY CALLING CQ FROM SCENIC PACIFICA . . . . on phone, and CQ CQ CQ DE W6GJV PACIFICA . . . on CW.

letters to the editor



The Editor,
RADIO ZS,
Cape Town.

Dear Sir,

ZS BOUQUET

When I saw the imposing collection of Amateur Radio Publications from all around the World assembled by my good friend Al Marcy W4ID I offered to send him some ZSs. This I did recently and his acknowledgement of them makes good reading. This is what he said. ". . . The early part of the week I received the copies of Radio ZS which you sent to me and I was very happy to receive them. These are not the run of the mill Amateur Club publications, but rather outstanding products very well put together and professionally printed. The South African Radio League is to be complimented on the excellence of its publication. While I have not had time to read them completely, I have enjoyed them very much and appreciate a look at the view the chaps on the other side of the World see. . . Again Roy thanks very much for Radio ZS, they will be a fine addition to my ever growing collection."

Yours sincerely,
Roy Ehman ZS6AR.

Hamads

P.O. BOX 137, CAPE TOWN — RATES: R0.50 for 20 words, 2 cents per word thereafter for members. Non-members and commercial smalls: R1.00 for 20 words, 4 cents per word thereafter. PLEASE SEND THE CORRECT AMOUNT WITH EVERY HAMAD OR SMALL.

W. H. (WALLY) BROWNING ZS6A takes pleasure in advising all his "ham" and other friends that he has joined the staff of Messrs. Wild & Marr Pty Ltd. of 128 Main Street, Johannesburg, leading radio spares stockists, and would welcome your enquiries at the above address.
Phone: 22-1415 or write to Box 3553 JOHANNESBURG.

FOR SALE: Heathkit SB300 Receiver. R160.
Heathkit SB400 180 watt PEP matching transmitter. R160. Good order. Phone ZS6AR 78-8494, 7 Johann Rissik Drive Waterkloof, Pretoria.

FOR SALE: The complete station of the late ZS6B1S comprising one crank-up tilt-over tower (35'), one TA-33 junior beam, one rotator and control, one KW-2000 tranceiver with AC power supply, one receiver (BC-794-B), loudspeaker and microphone. Price R500 o.n.o. Buyer to collect. Phone 53-3017 or write to 45, 2nd Avenue, Edenvale per Mrs. Davies.

FOR SALE: Central Electronics 20A SSB Transmitter, Vox, CW, AM, P.M. USB, LSB. New tubes R85 with coupled V.F.O. S x 28 Super Skyrider — Good condition. Excellent SSB reception. R80 o.n.o.
A. Mirwis ZS6ASR, 35 Mons Rd, Delville, Germiston, Phone 51-1447.

FOR SALE: CREED Mark 7 teleprinter and home brew terminal unit to RTTY circuit fully operative. R40. Phone Johannesburg, evenings 41-9620 and weekends.

Keen on going RTTY? Available: CREED 8B machines as used by most hams throughout the world.
Guaranteed, air tested machines at R25 each.
Mint but untested at R20 each. Complete but in need of cleaning and lubrication — R15 each. All F.O.R. Florida, Tvl.
Circuitry tuning forks etc., also available. Golden opportunity to obtain a teleprinter at approximately one fiftieth of the original cost.
Write to ZS6BDS, Box 155, Florida, Tvl.

FOR SALE: New shipment just arrived. Latest series trio-510 Transceivers. Complete with AC Power Supply, and loudspeaker— R285. Remote V.F.O. for above is recommended to make this a complete and most versatile station — R45. Please contact P.L. Malherbe (Pty.) Ltd. Box 84, Grabouw C.P. Attention ZS1JU.

FOR SALE: Heathkit DX60 transmitter AM-CW, 80 through 10 meters, separate variable frequency oscillator VF 1. Also stepdown transformer. Complete transmitting station ideal beginner or standby rig. Excellent condition. First R50 procures.
F.O.R. ZS21Q 21 Seymour St., Grahamstown.

FOR SALE: Heathkit SB300 Side Band receiver R160.
Heathkit SB400 Side Band transmitter R160 Good condition. ZS6AR. Phone 78-8494, Pretoria.

FOR SALE: TX: HX 10 Marauder, 180w SSB 100 W AM.
RX. KW 77 MKV Triple Conversion.
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FOR SALE:
Seeing is believing — Hear you must!

SINCLAIR Q14 Speaker, driven by SINCLAIR Z12 HI-FI AMP & PRE-AMP. Powered by SINCLAIR PZ4 Stabllised mains power supply unit.

When used as stereo, SINCLAIR STEREO 25. De Luxe pre-amp and Control Unit will produce true STEREO HI-FI at a very low price.

Other SINCLAIR products available soon. Mail-orders only. S.A.E. with all enquiries please. Mail-Orders, P.O. Box 181, King William's Town.

Stan French ZS1YD of Leisure Isle, Knysna showing off his FTDX100 to Johnny Neethling ZS1GB of Fish Hoek

LEBANESE DX CONTEST

The Lebanese Amateur Radio Association (RAL), in cooperation with the Lebanese Ministry of Tourism, Middle East Airlines AirLiban, and the Cadmos Hotel, announces a special DX contest commemorating its 20th Anniversary.

Contest Period : 00.01 GMT, 4 October 1969, through 23.59 GMT 12 October 1969.

Procedure : An OD station may be worked only once per band for credit (CW or phone), but may be worked on additional bands for additional point credit.

Points : Contacts from Europe, Africa, and Asia count one point on 10, 15, and 20 meters; 2 points on 40 meters; and 3 points on 80 meters.
Contacts from North and South America, Oceania, and Antarctica count 2 points on 10, 15, and 20 meters; 4 points on 40 meters; and 6 points on 80 meters.

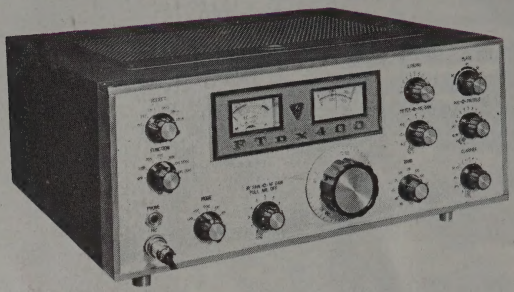
Scoring : Final score is the total of points on all bands.

Logs : Submit list of contants with date and time in GMT, band, and points claimed to: RAL, P.O.B. 1217, Beirut, Lebanon. Mailing deadline is 1 November 1969.

Prizes : Grand prize of air tickets for two to Beirut from any point on the MEA route plus a free double room at the Cadmos Hotel in Beirut for one week. Both good any time during the period 1 March through 31 August 1970.

The high scorer on each continent will be awarded a silver cup, and the high scorer in each country and U.S. call district will be awarded a special certificate.
Decisions of the RAL Committee shall be final.

YAESU MODEL FT-DX-400 SSB TRANSCEIVER



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